

NON-PUBLIC?: N  
ACCESSION #: 8902230429  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Trojan Nuclear Plant PAGE: 1 OF 4

DOCKET NUMBER: 05000344

TITLE: Reactor Trip on Low Reactor Coolant Loop Flow Signal Due to a  
Technician's Procedural Error  
EVENT DATE: 08/16/88 LER #: 88-026-01 REPORT DATE: 02/15/89

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: John Guberski, Compliance Engineer TELEPHONE: 503-556-3713

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE TO NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

#### ABSTRACT:

On August 16, 1988, the plant was in Mode 1 (power operation). Reactor coolant loop 'B' flow transmitter (FT)-424 was out of service for calibration with its low flow bistable tripped. At 1107 a reactor trip occurred on a Reactor Coolant System loop 'B' low flow signal. Venting of FT-424 caused a transient on a second loop 'B' flow transmitter, FT-425, which shares a common high pressure sensing line. This transient caused FT-425 to momentarily sense pressure below the low flow setpoint and trip its low flow bistable. This satisfied the logic for a reactor trip on loop low flow.

Immediate corrective action was to carry out the emergency instruction recovery actions and to restore flow transmitter FT-424 to service. The root cause of the event was inadequate work instructions on risks associated with venting FT-424. The cause of the reactor trip was a technician's procedural error in re-venting FT-424 with the transmitter valved into service. Plant procedures were revised to provide additional reviews and controls for tasks that could cause a reactor trip or Engineered Safety Features system

actuation.

This event had no effect on public health and safety. There was no actual plant condition requiring a reactor trip however, the reactor protection system functioned as designed to trip on reactor on receipt of a loss of flow trip signal.

END OF ABSTRACT

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#### Description of Event

On August 16, 1988, the plant was in Mode 1 (power operation) with the Reactor Coolant System (RCS) at 585 degrees F and 2240 psig. Reactor coolant loop 'B' flow transmitter (FT)-424 was out of service for calibration with its low flow bistable tripped. At 1107 a reactor trip occurred on an RCS loop 'B' low flow signal. Venting of FT-424 caused a transient on a second loop 'B' flow transmitter, causing it to indicate below the low flow setpoint and trip its low flow bistable. This satisfied the logic for a reactor trip on loop low flow.

Three flow transmitters are used to measure the flow of each reactor coolant loop. Each of the transmitters has a low flow bistable associated with it. The bistables are set to trip if the flow being sensed falls to a value less than 90% of loop design flow. If two out of three bistables in a loop trip, a single loop loss of flow signal is sent to the Reactor Protection System. A reactor trip will occur if two out of four power range channels exceed the P-8 setpoint (39% reactor power) when a loss of flow signal is generated.

The instruments used for loop flow indication are differential pressure transmitters measuring pressure drop due to flow through an elbow in each reactor coolant loop. The low pressure side of each differential pressure transmitter is connected to the RCS by separate tubing. The three transmitters in each loop share a common high pressure side tap into the RCS and associated tubing run between the elbow tap and each transmitter. Isolation valves are installed to permit each transmitter to be isolated during maintenance or calibration.

On August 14, 1988, it was noted that the three channels of RCS loop 'B' flow indication were approaching their channel check limit. A channel check of these instruments is required to be performed at least once per 12 hours by Trojan Technical Specification 3/4.3.1, "Reactor Trip System Instrumentation", Table 4.3-1. A Maintenance Request was initiated to check operation of the three loop 'B' transmitters (FT-424, 425, 426) and determine the cause of the discrepancy. A subsequent calibration check revealed that FT-424 indicated

flow was in error and the transmitter was in need of calibration.

The Shift Supervisor, Control Operator, and Instrument and Control Technician discussed the calibration evolution prior to its commencement. The requirement to trip the instrument's low flow bistable was discussed and the technician was cautioned to ensure work was done on the proper channel. The transmitter is calibrated dry, requiring that it be isolated and drained prior to calibration. It was recognized that the three loop 'B' transmitters shared a common high pressure tap and that the transmitter was required to be valved in and vented slowly following calibration to preclude affecting indication on the other two loop 'B' instruments.

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Flow transmitter FT-424 was removed from service for calibration and its bistable tripped at 0938 on August 16. Calibration was completed and isolation valves opened to fill and vent the transmitter. At 1107 a reactor trip occurred. All plant equipment responded as designed. Train 'A' and 'B' auxiliary feedwater pumps started on a steam generator low-low water level trip. A feedwater isolation occurred on reactor trip coincident with a low RCS Tavg signal. Operators responded to the trip in accordance with Emergency Instruction (EI)-O, "Reactor Trip, Safety Injection and Diagnosis". The electric AFW pump was started at 1128 and the Train A and B AFW pumps were subsequently shut down. FT-424 was returned to service and its bistable restored at 1316. It was determined that the reactor trip was initiated by a loop 'B' RCS low flow signal with power above the P-8 setpoint. Venting of air from transmitter FT-424, after returning it to service, caused a momentary pressure drop in the high pressure sensing line common to all three flow transmitters for the 'B' RCS loop. The low pressure spike lowered the output of the adjacent reactor coolant flow transmitter FT-425 to below 90%, thus tripping its low flow bistable. With the low flow bistables for FT-424 and FT-425 both tripped, the two out of three logic necessary to generate a loop loss of flow signal was satisfied. Since reactor power was above the P-8 setpoint, a reactor trip occurred. Venting the transmitter while it was in service was not covered in the work instructions.

#### Cause of Occurrence

The root cause of this event was inadequate work instructions where a single evolution or task could cause a reactor trip. The work instructions did not tell the technician that venting the common high pressure sensing line could affect the other two flow measurement channels. A contributing cause was a personnel error (procedural) in reventing FT-424 with the transmitter returned to service. The work instructions covered venting with the transmitter out of service.

## Corrective Action

The immediate corrective action following the reactor trip was to carry out the emergency instruction recovery actions and to restore flow transmitter FT-424 to service. Immediate notification of this event was provided to the NRC at 1141. Flow transmitter FT-426 was removed from service, calibrated and returned to service at 1618. Following management review of the trip and approval to restart, reactor startup was begun at 1935, with the reactor being taken critical at 2016. The reactor was returned to 100% power at 0458 on August 17.

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Permanent corrective action was to revise plant procedures to include additional revisions and controls for maintenance work where a single evolution or task could cause a reactor trip or Engineered Safety Features system actuation. The personnel error was corrected by having the individual involved lead a peer group evaluation. This group, and individual, concluded that an avoidable error was made by not thinking through results of an action.

## Significance of Occurrence

This event had no effect on public health and safety. There was no actual plant condition requiring a reactor trip; however, the reactor protection system functioned as designed to trip the reactor on receipt of a loss of flow trip signal.

ATTACHMENT 1 TO 8902230429 PAGE 1 OF 1  
PGE

Portland General Electric Company  
Trojan Nuclear Plant February 15, 1989  
71760 Columbia River Hwy CAO-066-89  
(503) 556-3713

US Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Gentlemen:

Licensee Event Report No. 88-26, Revision 1, is attached. This report updates an event in which a reactor trip occurred on a low reactor coolant loop flow signal due to a technician's procedural error.

Sincerely,

C. A. Olmstead  
General Manager  
Trojan Nuclear Plant

c: Mr. John B. Martin  
Regional Administrator  
US Nuclear Regulatory Commission

Mr. Bill Dixon  
State of Oregon  
Department of Energy

Mr. R. C. Barr  
USNRC Resident Inspector  
Trojan Nuclear Plant

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